NISTTech

Methods for Machining Hard Materials using Alcohols

Rapid machining of advanced ceramics

Description

Lower your costs and improve the speed of rapid machining of advanced ceramic materials by using long chain alcohols such as oleyl alcohol. These machining fluids act as lubricants, coolants and antioxidants, increasing the effective life of diamond machining tools. The surface finish of the final product is not harmed, and in many cases, significantly improved over prior methods.

The machining fluids of the present invention can be used in connection with any conventional hard abrasive machine tools for machining advanced materials without the need of additional apparatus. Examples of these machining tools include grinding wheels, cutting wheels, polishing wheels, drills, millers, etc. The fluid can be applied directly onto the contact interface during machining through any suitable pathway, e.g., spraying, immersion, drop feeding, injection, or coating, or applied to the advanced material surface prior to washing.

Applications

- **Machining**
  May be used in rapid machining of advanced materials to improve the material removal rate and reduce the cost of machining, particularly when used with tools having a Mohs hardness of 9 or greater such as boron carbide and diamond.

Advantages

- **Cost saving**
  The fluids protect the diamond tools from wear, keeping them sharper longer and increasing their effective life before needing replacement.
- **Time saving**
  The number of parts machined before re-dressing the tool is increased (e.g. parts/hour).
- **Reduces friction**
  This lubricant reduces friction and prolongs the life of precision cutting tools.

Abstract

The present invention provides a method for machining hard materials using the machining fluids containing long chain alcohol in which the machining fluid is applied to a machining tool and then lubricates the machining of the workpiece by the machining tool and protects the machining tool during machining. The method is particularly useful when used with machining tools having a Mohs hardness of at least 9 and is most particularly useful when used with diamond machining tools.

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References

- Expired U.S. Patent # 6,206,764
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Status of Availability

This technology is available in the public domain.

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